Association between positive corneal rim cultures and microbiology screening protocols in Ontario

Rahul A. Sharma, MD,[*,a] John S.Y. Park, MD,[*,a] Yao Wang, MD,[†] Tinghua Zhang, MSc,[‡] Linda Sharpen, MLT,[§] William Dixon, MD,[¶] Rookaya Mather, MD[#]

ABSTRACT ●

Objective: (*i*) To assess the rate of positive microbiological cultures of corneas prepared by the Eye Bank of Canada (Ontario Division) between January 1, 2012, and December 31, 2013; (*ii*) to review the microbiology protocols at the 5 major transplant centres in Ontario; and (*iii*) to assess the incidence of endophthalmitis during the study period.

Design: Retrospective chart review.

Participants: A total of 4186 consecutive cultured corneal tissues prepared by the Eye Bank from January 1, 2012, to December 31, 2013.

Methods: Rates of culture-positive cornea rims and incidence of postkeratoplasty endophthalmitis at 5 surgical centres in Ontario were determined, and the protocols used to culture rims at each site were concurrently reviewed. Culture results were analyzed via logistic regression for positive cultures.

Results: The rate of positive cultures at each sites were as follows: centre A, 3.74%; centre B, 3.26%; centre C, 0.51%; centre D, 0.48%; and centre E, 0.04%. Centres A, B, and D were noted to have significantly higher positive rates than centre E. In comparing microbiology protocols, longer incubation period (11 days) was 12 times more likely to be associated with higher positive culture rates than shorter period (4–5 days). Six-month follow-up of all keratoplasties revealed zero reported cases of endophthalmitis.

Conclusions: A literature review regarding the predictive value of routine culturing reveals conflicting data. Our findings suggest that differences in the microbiology protocols directly influence the rates of positive rim cultures. Without a standardized protocol, it is not possible to evaluate the predictive value of routine corneal rim culturing in predicting postkeratoplasty endophthalmitis.

Corneal transplantation is considered to be one of the most common and successful types of transplantation surgery, allowing for the restoration of visual function from impairment due to corneal pathology.[1] In Ontario, donor corneas are procured from various provincial hospitals and sent to the Eye Bank of Canada (Ontario Division) for preparation (Table 1). All corneas are treated with 5% povidone-iodine solution, and once viability is confirmed, they are distributed in Optisol-GAS medium to transplantation centres for use in surgery. The hospitals performing the highest volume of corneal transplantation surgery in Ontario are located in Hamilton, Kingston, London, Ottawa, and Toronto. Data are collected by the Eye Bank from each surgeon regarding tissue-related complications at the time of surgery and 6 months later. The Eye Bank follows up with each surgeon to document any clinical complications, including endophthalmitis. If an infective complication related to a donor cornea is reported, the Eye Bank tracks the patient who received the mate cornea and the surgeon to verify any complications.

Positive corneal rim cultures have been reported in the literature, with the rate ranging from 0.53% to 15.7%.[1–5] Additionally, in a systemic review, Wilhelmus and Hassan noted that, of 17 614 corneal grafts, there were 31 endophthalmitis complications, with 21 having concordant donor and recipient isolates.[6]

Endophthalmitis is an uncommon but serious complication of corneal surgery, occurring in 1 of every 500 penetrating keratoplasties.[7] A systematic review by Taban et al. notes an overall pooled international estimate of 0.38% for acute endophthalmitis after penetrating keratoplasty.[7] To date, there have been only 2 cases of bacterial and 1 case of fungal endophthalmitis reported after Descemet stripping endothelial keratoplasty (DSEK).[8–10] No cases of endophthalmitis have been reported after Descemet membrane endothelial keratoplasty surgery.

In Ontario, although corneal culturing is not done by the Eye Bank, it is performed at the time of surgery. However, no single microbiology protocol has emerged as an accepted standard for culturing corneal tissue. Instead, perioperative screening of corneas is performed based on each centre's respective microbiology protocols. Differences in the screening protocols include the specific culturing medium used, conditions for micro-organism growth, and the duration of incubation period before the detection of microbial growth. This variability in individual protocols may be responsible for the disparity in the rate of positive cultures found among centres.

© 2017 Published by Elsevier Inc on behalf of the Canadian Ophthalmological Society.
http://dx.doi.org/10.1016/j.jcjo.2017.09.009
ISSN 0008-4182/17

Canadian Ophthalmological Society | Société canadienne d'ophtalmologie
EYE PHYSICIANS AND SURGEONS OF CANADA | MÉDECINS ET CHIRURGIENS OPHTALMOLOGISTES DU CANADA

Table 1—Summary of corneal excision protocol performed by the Eye Bank of Canada (Ontario Division)

Sterilization	1. All procedures done in laminar flow hood with sterile gown/gloves 2. Sterilize workspace with 70% alcohol. 3. Cut off extra tissue, conjunctiva, and muscles of the eye with scissors. 4. Sterilize eye in 5% povidone-iodine solution for 3–5 minutes and rinse with saline.
Isolation of cornea	5. Further removal of conjunctiva (flush at the limbus) and excess muscle (extending out 5 mm from the limbus) as necessary 6. Make incision through the sclera, anterior to the choroid, parallel to, and 2–4 mm from the limbus. 7. Extend the scleral incision 360° around the cornea without perforating the choroid, breaking the anterior chamber, or causing deformation of the cornea curvature. 8. Keep the incision parallel to the limbus to produce an even scleral rim 3–5 mm in width. 9. Confirm that anterior chamber is intact (corneoscleral button should be attached to the ciliary body-choroid only at the scleral spur). 10. Separate the ciliary body and iris adhesions from the corneoscleral button. 11. Transfer to the storage media.
Storage medium	12. Prepared corneoscleral button is transferred to the storage media (Optisol-GS).
Distribution of corneal tissue	No microbiological cultures are performed at the Eye Bank.

Although perioperative screening is intended to reduce the infective risk, the value of such testing in improving clinical outcomes is unclear, with a number of studies suggesting that such testing has no value in predicting infectious complications.[11–13] Furthermore, screening has a substantial cost, estimated by Wiffen et al. at $2 000 000–$6 000 000 per year in the United States.[13] Overall, the evidence supporting routine perioperative screening remains scant, and further investigations are required to determine its value in patient care. Currently, routine culturing is not a requirement of the Eye Bank Association of America Medical Standards.[14]

To our knowledge, no previous studies have evaluated the association between microbiological screening procedures in Canada and the positive culture rates of cornea rims. The purpose of this study was 3-fold: (*i*) to assess the rate of positive microbiological cultures of donor corneal tissue prepared by the Eye Bank of Canada (Ontario Division) between January 1, 2012, and December 31, 2013; (*ii*) to review the microbiology protocols at the 5 major transplant centres in Ontario; and (*iii*) to assess the incidence of endophthalmitis during the study period.

Given the uncertainty surrounding the predictive value, cost, and practicality of routine corneal screenings and variability among the microbiological protocols used in this setting, it is our hope that the findings of this report will contribute to advances in understanding the value of corneal rim culturing and establishment of evidence-based practices in eye banking.

Methods

A total of 4186 consecutive, cultured, donor corneal tissues prepared by the Eye Bank of Canada (Ontario Division) for a 2-year period from January 1, 2012, to December 31, 2013, were retrospectively identified and reviewed. Data regarding the site of surgery, surgeon, type of surgery, and perioperative culture result were recorded. The rate of culture-positive cornea rims and cases of endophthalmitis at 5 surgical centres in Ontario (Hamilton, Kingston, London, Ottawa, and Toronto) were determined. The microbiological protocols used to culture corneal rims at each centre were collected and evaluated for differences. Subsequently, the differences among the 5 protocols were individually compared to the rate of culture-positive rims to identify possible explanations for the higher rates of positive cultures seen at certain hospitals in Ontario. Specifically, all of the results were analyzed via logistic regression for positive cultures. Predictors yielding significant outcomes were identified, and odds ratio estimates with Wald confidence intervals were determined. For the purposes of this analysis, the results of the 5 centres have been made anonymous; they are henceforth described as centres A–E.

Results

The rate of culture-positive corneal rims from the 2-year period was determined. It should be noted, however, that not all centres cultured every cornea received; centres A and D cultured all the transplanted corneas, whereas other centres did so to variable degrees. From 4186 cultured corneal rims, 32 (0.76%) were culture-positive: centre A, 3.74% (20/535); centre B, 3.26% (7/215); centre C, 0.51% (1/197); centre D, 0.48% (3/629); centre E, 0.04% (1/2610) (Table 2). The micro-organisms from the positive cultures have been identified, with *Staphylococcus epidermidis* and *Candida albicans* being the 2 most common (Table 3). Subsequently, all centres were compared against the centre with the lowest rate of positive cultures (centre E); 3 centres were noted to have

Table 2—Two-year positive microbiological culture rates in donor corneal rims cultured at 5 transplantation centres in Ontario and the incubation period before deeming a negative culture in each respective protocol

Transplantation Centres	Two-Year Positive Culture Rates (Number of Positive Cultures/ Total Transplants Performed)	Days of Incubation Before a Culture Was Deemed Negative
A	20/535 (3.74%)	11
B	7/215 (3.26%)	5
C	1/197 (0.51%)	5
D	3/629 (0.48%)	5
E	1/2610 (0.04%)	4

Download English Version:

https://daneshyari.com/en/article/8791645

Download Persian Version:

https://daneshyari.com/article/8791645

Daneshyari.com